

# NWSA Conference 2018

## The Digital Transformation Age

The Fourth Industrial Revolution (Klaus Schwab)

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# OBJECTIVES

- ▶ Increase our awareness of the comprehensiveness and speed of the technological revolution and its multifaceted impact.
- ▶ Create a platform for thinking about the technical revolution in terms of our response to this new technology.
- ▶ Inspire our industry on issues related to the technical revolution we are witnessing on a day to day basis.

# A Historical Look Back

- ▶ “Revolution” denotes an abrupt and radical change.

Given history as a reference for change, the abruptness and radical changes can take years to unfold.

First profound shift: 10,000 years ago, from foraging to farming and the domestication of animals known as the Agrarian revolution.

Combining animals with humans improve food production, spurring population growth and enabling larger human settlements.

Second profound shift: A series of industrial revolutions that began in the second half of the 18<sup>th</sup> century.

The transition from muscle power to mechanical power evolving us to where we are today.

## First Industrial revolution

1760 to 1840

- ▶ Construction of railroads, invention of the steam engine, mechanical production of commodities.

## Second Industrial Revolution

1900's to 20<sup>th</sup> century

- ▶ The advent of electricity, mass production of widgets and commodities, use of assembly lines for production.

## Third Industrial Revolution

1960's through 1990's

- ▶ Known as the computer or digital revolution.
- ▶ The creation of semiconductors, mainframe computers (1960's)
- ▶ The creation of personal computers (1970's and 1980's)
- ▶ The creation of the internet (1990's)

# The Fourth Industrial Revolution

- ▶ Characterized by a mobile internet.
- ▶ Smaller and more powerful sensors; cameras, listening devices.
- ▶ Cheaper more sophisticated and integrated devices; cell phones, iPads.
- ▶ The creation of “Artificial Intelligence” and “Machine learning”.
- ▶ Referred to as “the second machine age”.
- ▶ Changing the world into a full force automation and making of unprecedented things.
- ▶ Creating smart factories that create a world in which virtual and physical systems of manufacturing globally cooperate with each other in a flexible way.

# Fourth Industrial Revolution

## Incorporating new technology

- ▶ Creation of new technologies;
- ▶ Gene Sequencing
- ▶ Nanotechnology
- ▶ Physical, digital and biological infusions of technology.
- ▶ 3D printing and the creation of instant materials or supplies.
- ▶ Rate of infusion into our societies at a rate never experienced world wide.
- ▶ Unprecedented consumer benefits resulting in a world of new information and freedom.
- ▶ Access to new products and services that are virtually free at the push of a button or a verbal command.

# Current Driving Forces

- ▶ Common features of technology and product development: All are made possible by the creation of digital technology
- ▶ Physical Trends:
- ▶ Autonomous vehicles: cars, trucks, drones aircraft, boats, submersibles.
- ▶ 3D Printing: Creating a physical object by printing layer upon layer from a 3D drawing or mold: Currently used in aerospace, automotive and medical industries. Eventually into circuit boards, human cells and organs.
- ▶ 4D Printing: on the horizon, capable or responding to environmental changes such as heat and humidity or footwear. Potentially adaptable to human body implants.

# Robotics

- ▶ Currently being used in all sectors of our economy and industries.
- ▶ Transformation of humans and machines becoming the norm.
- ▶ Robots will be able to see, feel, understand, express emotion and adapt to changes in their surroundings and the environment in which they are exposed.
- ▶ Robots can access information remotely via the cloud and connect with a network of other robots.
- ▶ Robots can perform everyday tasks and chores within a industry or household.
- ▶ **Google Home, Amazon Echo, Alexa, Siri are robotics we already interact with.**

# New Materials

- ▶ Advancement of nanomaterials such as Graphene.
- ▶ Graphene is 200 times stronger than steel, a million times thinner than a human hair and an efficient conductor of heat and electricity.
- ▶ A micrometer-sized flake costs approximately \$1,000.00.
- ▶ Thermoset Plastics: Could make reusable materials that have been consider impossible to recycle recyclable.

# Digital Transformations

- ▶ IoT: The internet of all things.
- ▶ Creates a bridge between physical and digital applications.
- ▶ Described as a relationship between things(products, services, places etc.) and people that is now possible by connecting technology and various platforms.
- ▶ Internet, smartphones, tablets, social media.
- ▶ Access to services, banking, credit, bill pay, security.

# Biological Innovations

- ▶ Example: It took more than 10 years at a cost of \$2.7 billion dollars to complete the Human Genome Project. Today a genome can be sequenced in a few hours at a cost of less than \$1000.00.
- ▶ Synthetic biology will provide new advances in customizing DNA in organisms.
- ▶ Genetic editing may provide cures to cancer and provide new pharmaceuticals or other forms of treatment.
- ▶ The possibility of growing organs with the goal of being available for human transplantation; Called Xenotransplantation.

# Challenges

## How to embrace the future

- ▶ Contextually: How we understand and apply our knowledge.
- ▶ Emotionally: How we process and integrate our thoughts and feelings and relate to ourselves and to one another.
- ▶ Inspirationally: How we use a sense of individual and shared purpose, trust, and other virtues to effect change and act towards the common good.
- ▶ Physically: How we cultivate and maintain our personal health and well-being and that of those around us to be in a position to apply the energy required for both individual and digital transformations.

# Conclusion

- ▶ Digital transformation is the next industrial revolution.
- ▶ Embrace the technology as it becomes available and use it to enhance your lifestyle and increase your competitiveness.
- ▶ Ensure safeguards for people in your family or business using digital technologies.
- ▶ Maintain a moral and ethical guideline when using new technology and provide guidance to new users.
- ▶ Questions ? Comments ?

If you think your car is high-tech now, just wait. When driverless cars arrive in a few years, computers might well be running the whole vehicle. Imagine the help-line calls to the manufacturers then.....

(taken from Reader's Digest March 2018 Issue)

**Help Line: GM help line. How can I help you?**

Customer: My car ran for a week, and now it won't go anywhere.

**Help Line: Is the gas tank empty:**

Customer: Huh? How do I know?

**Help Line: There is a gauge on the front panel, with a needle and markings from "E to F." Where is the needle pointing?**

Customer: I see an E but no F.

**Help Line: The F is to the right of the E.**

Customer: To the right of the E is V.

**Help Line: A "V" ?**

Customer: Yeah, there's a C, an H, the first E, then a V, followed by R, O, L---

**Help Line: That's the front of the car. When you sit behind the steering wheel, that's the panel...**

Customer: The steering wheel thingy- is that the round thing that honks the horn?

**Help Line: Yes, among other things.**

Customer: The needle's pointing to the "E". What does that mean?

**Help Line: It means that you have to visit a gasoline vendor and purchase more gasoline. You can install yourself or pay the vendor to install it for you.**

Customer: What?!!! I paid \$32,000 for this car!!! Now you tell me that I have to keep buying more components? I want a car that comes with everything built in !!!!